Proposed Plan

PJP Landfill Superfund Site

Jersey City, Hudson County **August 18, 1994**

I. PURPOSE OF PROPOSED PLAN

This Proposed Plan describes the remedial alternatives considered for the PJP Landfill Superfund Site (the Site) and identifies the preferred remedial alternative along with the rationale for this preference. The Proposed Plan was developed by the New Jersey Department of Environmental Protection (NJDEP), as lead agency, with support from the U.S. Environmental Protection Agency (EPA). NJDEP is issuing the Proposed Plan as part of its public participation responsibilities under Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended, and Section 300.430(f) of the National Contingency Plan (NCP). The alternatives summarized here are described in the Remedial Investigation and Feasibility Study (RI/FS) report which should be consulted for a more detailed description of all the alternatives.

This Proposed Plan is being provided as a supplement to the RI/FS report to inform the public of NJDEP's and EPA's preferred remedy and to solicit public comments pertaining to all the remedial alternatives evaluated, as well as the preferred alternative.

The remedy described in the Proposed Plan is the preferred remedy for the Site. Changes to the preferred remedy or a change from the preferred remedy to another remedy may be made, if public comments or additional data indicate that such a change will result in a more appropriate remedial action. The final decision regarding the selected remedy will be made after NJDEP and EPA have taken into consideration all public comments. We are soliciting public comment on all of the alternatives considered in the detailed analysis of the RI/FS because NJDEP and EPA may select a remedy other than the preferred remedy.

II. COMMUNITY ROLE IN THE SELECTION PROCESS

EPA and NJDEP rely on public input to ensure that the concerns of the community are considered in selecting an effective remedy for each Superfund site. To this end, the RI/FS reports, Proposed Plan, and supporting documentation have been made available to the public for a public comment period which begins on August 2, 1994 and concludes on August 31, 1994.

A public meeting will be held during the public comment period at the Jersey City Municipal Building on Thursday, August 18, 1994 at 7:00 PM to present the results of the RI/FS reports, to elaborate further on the reasons for recommending the preferred remedial alternative, and to receive public comments.

Comments received at the public meeting, as well as written comments received before or after the meeting, will be documented in the Responsiveness Summary section of the Record of Decision (ROD), the document which formalizes the selection of the remedy. All written comments should be addressed to:

Donald J. Kakas, Acting Chief
Bureau of Community Relations
Site Remediation Program
Department of Environmental Protection
CN 413
Trenton, NJ 08625-0413

Dates to Remember
August 2, 1994 through September 30, 1994
Public Comment Period

Thursday, August 18, 1994 at 7 p.m.
Public Meeting at the Jersey City Municipal Building
280 Grove Street
Jersey City, New Jersey

New Jersey Department of Environmental Protection
Site Remediation Program
(609) 984-3081 • Bureau of Community Relations

III. Administrative Record File Locations

The Administrative Record File contains the information upon which the selected response action will be based. The Administrative Record File, assembled to date, is available at the following locations:

New Jersey Department of Environmental Protection
401 East State Street
Trenton, NJ 08625-0413
Phone (609) 984-3081

Copies of the RI/FS reports, Proposed Plan, and supporting documentation are also available at the following locations:

Jersey City Public Library
472 Jersey Avenue
Jersey City, NJ 07302
(201) 547-4516

Jersey City Municipal Building
Engineering Division
280 Grove Street
Jersey City, NJ 07302
(201) 547-6852

IV. SITE BACKGROUND

The Site occupies approximately 87 acres in Jersey City, Hudson County, New Jersey. The Site is bordered on the north and west by the Hackensack River and on the east by Truck Routes 1 and 9. The Site extends northeast towards Hackensack Avenue and Broadway Avenue. A truck stop, a recycling facility and a warehouse are also located in this area. Multiple dwelling housing units are located northeast and southeast of the Site. The Pulaski Skyway, an elevated highway, passes over the Site. The Sip Avenue Ditch bisects the Site and conveys run-off from the PJP Landfill and Jersey City storm water/ sewer into the Hackensack River.

The Site was originally a salt meadow, a portion of which was condemned in 1932 for the construction of the Pulaski Skyway. The PJP Landfill Company operated a commercial landfill at the Site, accepting chemical and industrial waste from approximately 1968 to 1974.

From 1970 to 1985, subsurface fires which were attributed to spontaneous combustion of subsurface drums and decomposition of landfill materials, frequently burned at a 45-acre portion of the PJP Landfill and emitted large amounts of smoke. In 1977, the NJDEP issued an order to the PJP Landfill Company to properly cover and grade the landfill, and to remove wastes in contact with the Hackensack River and the Sip Avenue Ditch. The PJP Landfill Company did not comply with the order.

Throughout the early 1980s, NJDEP and the Hudson Regional Health Commission inspected the Site and conducted sampling and air monitoring. In December 1982, the Site was included on the EPA's National Priorities List (NPL), which identifies hazardous waste sites that pose a significant threat to public health or the environment.

During 1985 and 1986, NJDEP conducted an Interim Remedial Measure (IRM) to extinguish the fires and cap the 45 acre area. The IRM resulted in the extinguishing of fires; excavation and recompaction of 1,033,000 cubic yards of material; and the removal of grossly contaminated soils, cylinders and drums containing hazardous materials on approximately 45 of the 87 acres. These hazardous materials were properly disposed of off site at secure landfills or hazardous waste incinerators. A fire break trench was installed and the 45 acre area was regraded, capped and seeded. A gas venting system was also installed on the 45-acre portion of the landfill. All subsurface fires have been out since the completion of the IRM in May 1986.

The NJDEP contracted ICF Technology, Inc. (ICF) in 1988 to perform an RI/FS on the entire 87 acres of the landfill. A Phase I RI was completed by ICF in 1990. The RI identified areas and levels of contamination at the Site. The study included a geographical investigation and a shock-sensitive drum investigation to determine the density and condition of buried drums, extent of landfill material, the shock sensitivity of drums, and drum markings. An FS was also performed, which developed and evaluated various remedial alternatives for addressing Site contamination.

In the summer of 1993, NJDEP implemented a plan to assist in the evaluation of the current impact the site was having on the adjacent Hackensack River and on the deeper aquifer of concern beneath the fill

material. The sampling effort consisted of the sampling of three shallow and three deep monitoring wells, and six surface water and sediment locations. In addition, a series of bioassays at the sediment sample locations and in the waters of the two wells with the highest levels of contamination was performed.

V. REMEDIAL INVESTIGATION SUMMARY

The purpose of the RI was to: 1) determine the nature and extent of contamination resulting from historic Site activities; 2) identify potential contaminant migration routes; 3) identify potential receptors of Site contaminants; 4) characterize potential human health risks and related environmental impacts; and 5) evaluate the current impacts, if any, the Site may have on the adjacent Hackensack River.

During the RI, surface and subsurface soil boring samples, excluding the capped area surface, were taken from the Site. The RI identified contaminants above NJDEP proposed health based soil cleanup criteria in surface soils, subsurface soils (excluding test pits) and test pits. The soil cleanup criteria, although not promulgated, is currently used in lieu of standards.

Arsenic was detected in the surface soils samples in concentrations greater than the proposed soil cleanup criteria of 20 parts per million (ppm). In the subsurface soils (excluding the test pits which are discussed later in the Proposed Plan), the following contaminants were detected at levels exceeding the cleanup criteria: Benzene (maximum concentration detected 1.6 ppm), bis(2-ethylhexyl)phthalate (maximum concentration detected 180 ppm) and chlorobenzene (maximum concentration detected 2.92 ppm).

Chemicals were detected more frequently, and in higher concentrations, in the
test pits than were detected in samples from other media. Bis(2-ethylhexyl)phthalate (maximum concentration detected 33,100 ppm) and petroleum hydrocarbons were the predominant organic chemicals found in the subsurface soils of those that exceed the proposed soil cleanup criteria. Other predominant organic chemicals detected in the soils sampled from the test pits that exceed the NJDEP proposed impact to ground water soil cleanup criteria are the following: benzene (maximum concentration detected 250 ppm), dieldrin (maximum concentration detected 200 ppm), tetrachloroethene (maximum concentration detected 41 ppm), and total xylenes (maximum concentrations detected 3900 ppm). Carcinogenic and non-carcinogenic polycyclic aromatic hydrocarbons (PAHs) and inorganic chemicals (metals) were also detected frequently in the subsurface soils.

The Sip Avenue Ditch sediment samples were compared to the National Oceanographic and Atmospheric Administration (NOAA) sediment screening criteria. This guidance sets criteria for contaminants which may have potentially harmful biological effects to aquatic life. Sediment contaminants were found in the Sip Avenue Ditch exceeding this screening criteria. The highest concentrations found were total PAH (14.8 ppm for carcinogenic PAH; 30.1 ppm for noncarcinogenic PAH), antimony (93.8 ppm), cadmium (6.3 ppm), chromium (771 ppm), copper (34,000 ppm), lead (406 ppm), mercury (5.1 ppm), nickel (1,260 ppm), and zinc (9,830 ppm).

Landfill gas vent sample data obtained during the Remedial Investigation was used to approximate the total amount of contaminants discharged from the gas vent system in terms of pounds per hour. Eight of the forty-nine existing vents were sampled on three separate occasions, and used as representative vents for the entire system. The maximum flow rate from the forty-nine vents was used to calculate potential discharges (8.73 cubic feet per minute/cfm) and the maximum contaminant concentrations from the three sample rounds was used for each contaminant.

Discharge numbers were calculated for total emissions and toxic emissions. Using the average and maximum contaminant concentrations for the eight landfill gas vents, typical landfill emissions and the worst case scenario emissions were determined. The total emissions average of .43 lbs/hr, and maximum of 1.5 lbs/hr, respectively, are within the acceptable/allowable limit of 1.5 lbs/hr. The toxic emissions average of .07 lbs/hr is also within the acceptable/allowable limit of .1 lbs/hr while the toxic emissions maximum of .27 lbs/hr is above the acceptable/allowable limit of .1 lbs/hr.

The NJDEP 1993 sampling effort revealed the following:

The monitor well analyses indicated that only 11 compounds were detected in the three (3) wells at levels slightly above New Jersey Surface Water Quality Standards. Hackensack River water and sediment samples were collected upstream and downstream of the site. These samples indicated the presence of VOC's, Semi-VOC's, pesticides/PCB's and Inorganics.

Contamination is also present in the Sip Ave ditch, both adjacent to Routes 1 & 9 and at the confluence of the ditch with the river. For the river water and ditch water samples, the highest levels of contamination were found in the Sip Ave ditch adjacent to Routes 1 & 9. The fact that contamination was detected both upstream and downstream in the Hackensack suggests that there may be multiple sources of contamination.

All four (4) of the bioassay sampling locations in the river, including the upstream location, and the two wells showed significant mortality. This data indicates that potential adverse impacts on biota by these contaminated waters is likely occurring.

The results of the Bedrock Aquifer Well sampling indicate that all three of these wells are below New Jersey Ground Water Quality Standards. The sampling results indicate that none of the contaminants found in the wells exceed NJDEP's Ground Water Quality Standards for Volatile Organics, Semi-Volatile Organics, and Pesticides.

VI. SUMMARY OF SITE RISK

Based upon the results of the RI, a baseline risk assessment was conducted to estimate the risk associated with the current and future Site conditions. The Baseline Risk Assessment estimates the human health and ecological risk which could result from the contamination at the Site if no remedial action were taken. The analysis assists in evaluating whether remediation is necessary.

Human Health Risk Assessment

A four step process is utilized for assessing site-related human health risks for a reasonable maximum exposure scenario: ***Hazard Identification*** - identifies the contaminants of concern at the Site based on several factors such as toxicity, frequency of occurrence, and concentration; ***Exposure Assessment*** - estimates the magnitude of actual and/or potential human exposures, the frequency and duration of these exposures, and the pathways by which humans are potentially exposed (e.g., ingesting contaminated soil/water); ***Toxicity Assessment*** - determines the types of adverse health effects associated with chemical exposures, and the relationship between magnitude of exposure (dose) and severity of adverse effects (response); and ***Risk Characterization*** - summarizes the combined output of the exposure and toxicity assessments to provide a quantitative (e.g., one -in-a-million excess cancer risk) assessment of site-related risks.

The Baseline Risk Assessment evaluated site-specific exposure scenarios that represent potential situations in which humans may be exposed to contaminants originating from the Site. Several scenarios, or exposure pathways, were selected for evaluation under both current and future land-use conditions. The risk assessment determined that the greatest risks associated with the Site under current conditions are: the incidental ingestion and dermal absorption of chemicals in sediment by trespassing children wading in the Sip Avenue Ditch; and the inhalation of chemicals that have been released from landfill gas vents by trespassing children, nearby workers, and nearby residents.

For carcinogens, risk is represented in terms of an individual's likelihood of developing cancer as a result of exposure to a carcinogenic chemical present in the exposure media (e.g., soil, sediment). The results of the Baseline Risk Assessment indicated that several exposure pathways pose an unacceptable risk to human health under current land-use conditions, with the greatest calculated risk from incidental ingestion and dermal absorption of chemicals in sediment by trespassing children wading in the Sip Avenue Ditch. The carcinogenic risk for children was estimated to be 4x10-5. The risk number means that four additional children out of one hundred thousand are at risk of developing cancer if the Sip Avenue Ditch sediment is ingested. Current federal guidelines for acceptable exposure are an excess carcinogenic risk in the range of 10-4 to 10-6 (one in ten thousand to one in one million). Where the calculated lifetime excess cancer risk is below 1x10-4, no remedial action is generally required under EPA guidelines.

To assess the overall potential for noncarcinogenic effects (e.g., toxicity) posed, EPA developed the Hazard Index (HI). This index measures the assumed simultaneous exposures to chemicals which

IX. REMEDIAL ACTION OBJECTIVES

Remedial Action Objectives are specific goals to protect human health and the environment. These objectives are based on available information, applicable or relevant and appropriate requirements (ARARs), and risk-based levels established in the risk assessment. The following remedial action objectives were established for cleanup activities at the Site:

-Prevent direct contact with the contaminated sediments in the Sip Avenue Ditch.

-Prevent additional contaminant influx into the ground water via infiltration of rain water.

-Mitigate the release of hazardous substances into air via gaseous emissions.

-Evaluate if future actions are necessary to mitigate the leaching of Site contaminants into the Hackensack River through the monitoring and modeling of potential impacts of leachate and ground water from the Site on the Hackensack River over time.

-Removal of contaminant sources that may impact ground water.

X. SUMMARY OF ALTERNATIVES

CERCLA requires that each selected Site remedy be protective of human health and the environment, be cost-effective, comply with other statutory laws, and utilize permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. In addition, the statute includes a preference for the use of treatment as a principle element for the reduction of toxicity, mobility, or volume of the hazardous substances.

The FS evaluates in detail several remedial alternatives for addressing the contamination associated with the first operable unit. These alternatives are:

Alternative LF-1: No Action
Alternative LF-2: Minimal Action
Alternative LF-3: Soil Cover
Alternative LF-4: NJDEP Solid Waste Cap (Extending Existing Cap)
Alternative LF-5: NJDEP Hazardous Waste Cap
Alternative LF-6: RCRA Hazardous Waste Cap - Incorporating Existing Cap
Alternative LF-7: New RCRA Hazardous Waste Cap

The following two options are applicable to Alternatives LF-3 through LF-7:

OPTION 1: No Drum Removal
OPTION 2: Drum Removal (All Known and Suspected Buried Drum Areas and Associated Soils)

For Alternatives LF-3 through LF-7 the SIP Avenue Ditch will be replaced with an alternative form of drainage, in order to prevent direct contact with the contaminated sediments. Design details related to the Sip Avenue Ditch will be resolved in the remedial design phase of the Project. The remedial design will also include a wetlands assessment to determine what wetlands were impacted or disturbed by contamination and a wetlands restoration plan to mitigate those areas found to have been impacted.

For Alternatives LF-3 through LF-7 the Design Phase will include a delineation of the extent of the area to be capped, up to the physical boundaries created by the building structures previously described in the Site background.

Under Alternatives LF-2, LF-3, and LF-4, the existing landfill gas venting system will be sampled during the design phase to determine compliance with current State and Federal air quality standards. If at that time air emissions are not in compliance with the accepted maximum limits for Total Volatile Organics, the appropriate measures will be incorporated into the design phase to bring the Site into compliance with air requirements.

For Alternatives LF-5, LF-6, and LF-7, the design phase will include a new landfill gas venting system that will be designed (active vs. passive) to comply (including treatment, if necessary) with State and Federal air quality standards.

This Proposed Plan presents alternatives, which are described in greater detail below. Implementation times given include the time necessary to construct and implement the remedy but do not include the

could result in adverse health effects. An HI greater than one (1) is generally identified with potential adverse health effects. For incidental ingestion/ dermal absorption of Sip Avenue Ditch sediments the HI was calculated to be four (4).

In addition to ingestion/dermal absorption of Sip Avenue Ditch sediments, other exposure pathways were found to exceed EPA's carcinogenic target risk range of 10-4 to 10-6 and to present human health risks under current land-use conditions. These included inhalation of chemicals released from landfill gas vents by trespassing children, nearby workers, and nearby residents. However, the HIs for these exposure pathways are less than one (1).

A qualitative risk assessment was performed for future land-use conditions. Although not likely, it is possible that land use at the Site could change in the future, resulting in additional exposure pathways that do not exist under current land-use conditions. The most plausible land-use change would be development of the landfill area as an industrial/commercial area. If the area were developed, on-site construction workers could be exposed via direct contact with contaminated sediments, subsurface soil, and materials in test pits, or air. Generally, the concentrations of chemicals detected in test pits and subsurface soils are substantially higher than in sediments. Therefore, future workers exposed to these subsurface contaminants could be at significant risk. Inhalation exposures are estimated to be approximately equal to those estimated for trespassing children. For long-term exposures, this risk would probably be greater than the 10-4 to 10-6 range. Future workers could also be exposed to chemicals released from landfill gas vents.

VII. ENVIRONMENTAL ASSESSMENT

The Environmental Assessment provides a qualitative evaluation of the actual or potential impacts associated with the Site on plants and animals (other than people or domesticated species). The primary objectives of this assessment were to identify the ecosystems, habitats, and populations likely to be found at the Site and to characterize the contaminants, exposure routes and potential impacts on the identified environmental components. Although the Environmental Assessment identified several endangered species and sensitive habitats in the vicinity of the Site, it concluded that chemical contamination from the Site is not expected to have significant impacts on plants or terrestrial wildlife, but may be impacting aquatic life.

The environmental assessment is summarized as follows:

- Some wetlands exist at the Site but were created due to previous landfilling activities. While wetland and upland plant species can be exposed to chemicals in surface soil, chemical-related impacts in plants are not expected to be significant and are most likely limited to contamination source areas (e.g., the drum disposal area).

- The Site is within the current or historical range of several State endangered or threatened species that inhabit coastal areas and/or marshes. Poten tial impacts associated with ingestion of surface water from the Sip Avenue Ditch are not expected to be significant because use of this surface water as a drinking water source by terrestrial wildlife at the Site is expected to be limited; most of the species that use the Site are likely to obtain water from their diet or from smaller surface water areas. In addition, potential impacts associated with exposure to chemicals that have accumulated in the food chain are not expected to be significant.

- Sediment concentrations for several chemicals in the Sip Avenue Ditch exceeded their respective toxicity values, suggesting that adverse impacts on aquatic life may be occurring at the Site.

VIII. SCOPE AND ROLE OF ACTIONS

The problems at the Site are complex, necessitating a phased approach for addressing site-related problems. This Proposed Plan will address cleanup remedies for the Sip Avenue Ditch sediment, air and landfilled material which includes areas of buried drums and surrounding contaminated soil. A monitoring program will be established to determine whether additional actions may be necessary to mitigate the leaching of contaminants to ground water and surface water as well as to the Hackensack River.

time required for design or award a contract for the performance of the work.

ALTERNATIVE LF-1: NO ACTION

Estimated Capital Cost:	None
Annual Operation and Maintenance:	None
Estimated Present Worth:	None
Estimated Implementation Time:	None

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) and CERCLA require the evaluation of a No Action alternative to serve as a point of comparison with other remedial action alternatives. Under this alternative, no action would be taken to contain, treat, or control the contamination at the Site. The subsurface soil contamination would decrease over a long period of time through natural processes such as flushing and attenuation. This alternative does not include any measures to restrict access to the Site. Essentially, the Site would remain the same as it is today.

ALTERNATIVE LF-2: MINIMAL ACTION

Estimated Capital Cost:	$209,000
Annual Operation and Maintenance:	$105,000
Estimated Present Worth:	$752,000
Estimated Implementation Time:	None

Under this alternative, no remedial action would be performed at the Site to contain, treat, or control the contamination at the Site. However, institutional controls, such as deed restrictions to restrict future use of the Site and public information programs to increase public awareness of potential problems associated with the Site, would be implemented. In addition, although most of the Site is already fenced, the existing fence would be extended to restrict access and reduce the potential for direct exposure to sediment contamination. Long-term monitoring of soil, sediment and air quality would be performed for a minimum of five years to evaluate the migration of contaminants from the Site and to monitor the effects of natural attenuation.

A Site review would be instituted at the end of five years in order to reevaluate Site conditions. This includes an evaluation of what additional measures, if any, should be implemented based on the Site conditions.

ALTERNATIVE LF-3: SOIL COVER

Estimated Capital Cost:	$16,368,000
Annual Operation and Maintenance:	$291,000
Estimated Present Worth:	$17,716,000
Estimated Implementation Time:	6 months

As described earlier, a 45-acre portion of the landfill was already partially excavated and capped with one foot of clay and one foot of soil during the completion of the IRM in 1986. Under this alternative, a two foot soil cover would be installed over the remaining, uncapped landfill area, which will be determined in design. The proposed soil cover design includes installation of a top soil layer over the uncapped area and vegetation to prevent soil erosion. Existing gas vents would be sampled and analyzed annually to monitor the gas releases to the atmosphere from the Site. If the gas poses a threat, treatment options would be developed and implemented. In addition, institutional controls and site fencing would be implemented as described for Alternative LF-2 above.

The soil covered area would require quarterly inspections and maintenance, and a review and reevaluation of Site conditions after five years.

ALTERNATIVE LF-4: NJDEP SOLID WASTE CAP (Extending Existing Cap)

Estimated Capital Cost:	$22,022,000
Annual Operation and Maintenance:	$369,000
Estimated Present Worth:	$23,707,000
Estimated Implementation Time:	1.5 years

As described earlier, a 45-acre portion of the landfill was already partially excavated and capped with one foot of clay and one foot of soil during the IRM. Under this alternative, the remaining landfill area, which will be determined in design, would be capped with a multi-layer, solid waste cap in accordance with NJDEP Bureau of Landfill Engineering guidance and New Jersey Solid Waste Regulations regarding closure and post closure requirements for solid waste landfills. The solid waste cap would combine several layers of cover materials, such as clean sand, soil and impervious layer such as a High Density Polyethylene (plastic) or clay liner to contain the contaminated solids. It would also include a top soil layer and vegetation to prevent soil erosion. The total thickness of the entire cap system would be approximately 3.5 feet. The existing gravel lined ditch along the southern border of the capped

portion of the landfill would be incorporated into the design of surface water run-off controls.

The use of a passive or active gas venting system would be determined during the remedial design phase of the project. Periodic inspections of the cover installed during the IRM will be performed before and during the implementation of the remedial action. If the cap is damaged or degraded, then at least one additional foot of topsoil will be spread over the previously installed cap. Ground water would be monitored quarterly to evaluate the reduction of contaminant concentrations and determine if natural attenuation is occurring at the Site. The Site would be reviewed at the end of five years in order to reevaluate Site conditions. The review would include an analysis of the surface and ground water monitoring data, which would be used in a ground water model aimed at evaluating what, if any, impact ground water or leachate is having on the Hackensack River. The review will also include an assessment of current residual health risks, an evaluation of the effectiveness of the Site fencing to control access, and an evaluation of what additional remedial measures, if any, should be implemented based on the reviewed Site conditions.

ALTERNATIVE LF-5: NJDEP HAZARDOUS WASTE LANDFILL CAP

Estimated Capital Cost:	$35,029,000
Annual Operation and Maintenance:	$369,000
Estimated Present Worth:	$36,714,000
Estimated Implementation Time:	3 years

As described earlier, a 45-acre portion of the landfill was already partially excavated and capped with one foot of clay and one foot of soil during the completion of the IRM. Under this alternative, the existing 45-acre cap would be left in place and a new multi-layer cap would be placed over the entire landfill area. The new cap would comply with the New Jersey Hazardous Waste Regulation (N.J.A.C. 7:26-10.8(i)) regarding closure and post closure requirements for hazardous waste landfills. The proposed cap would consist of a vegetative top soil cover, a sand drainage layer, a bedding layer and a liner system constructed of two synthetic liners. The total thickness of the entire cap system would be approximately 6 feet. The existing gravel-lined ditch would be incorporated in the design to aide with the collection of surface water run-off.

In addition, institutional controls and Site fencing would be implemented as described for Alternative LF-2 above. Regular monitoring and a five year review would also be required as described for Alternative LF-4 above.

ALTERNATIVE LF-6: RCRA HAZARDOUS WASTE CAP (INCORPORATING EXISTING CAP)

Estimated Capitol Cost:	$44,226,000
Annual Operation and Maintenance:	$369,000
Estimated Present Worth:	$45,911,000
Estimated Implementation Time:	3 years

As described earlier, a 45-acre portion of the landfill was already partially excavated and capped with one foot of clay and one foot of soil during the completion of the IRM. Under this alternative, the existing cap would be upgraded and incorporated into a Resource Conservation and Recovery Act (RCRA) cap, which would be installed over the remaining landfill area, which will be determined in design. The RCRA cap is a multi-layer cap that combines several layers of cover materials such as soil, synthetic membranes, and clay to provide erosion and moisture control, in addition to containing the contaminated solids. The entire Site would be graded for proper drainage and seeded with grass for erosion control. The total thickness of the entire cap system would be approximately six feet. The existing gravel-lined ditch would be incorporated in the design to aide in the collection of surface water run-off.

This alternative includes institutional controls and Site fencing as described in Alternative LF-2. Regular monitoring and a five year review would also be required as described for Alternative LF-4.

ALTERNATIVE LF-7: NEW RCRA HAZARDOUS WASTE CAP

Estimated Capital Cost:	$47,879,000
Annual Operation and Maintenance:	$369,000
Estimated Present Worth:	$49,564,00
Estimated Implementation Time:	3 years

Under this option, the existing cap would be removed, spread over the Site, and used as the first layer of fill. A new RCRA cap would be placed over the entire landfill area, which will be determined in design. As described in Alternative LF-6, the RCRA cap is a multi-layer cap

that combines several layers of cover materials such as soil, synthetic membranes, and clay to provide erosion and moisture control, in addition to containing the contaminated solids. The total thickness of the entire cap system would be approximately six feet. The entire Site would be graded for proper drainage and seeded with grass for erosion control. The existing gravel-lined ditch would be incorporated in the design to aide in the collection of surface water run-off.

This alternative includes institutional controls and Site fencing as described for Alternative LF-2. Regular monitoring and maintenance and a five year review would also be required as described for Alternative LF-4.

OPTION 1: NO DRUM REMOVAL

Estimated Capital Cost:	NONE
Annual Operation and Maintenance:	NONE
Estimated Present Worth:	NONE
Estimated Implementation Time:	NONE

Under this alternative, no excavation and removal of known buried drums and associated contaminants would be performed prior to capping.

OPTION 2: DRUM REMOVAL (EXCAVATION AND REMOVAL OF ALL KNOWN AND SUSPECTED BURIED DRUMS AND ASSOCIATED SOILS)

Estimated Capital Cost:	$514,000*
Annual Operation and Maintenance:	NONE
Estimated Present Worth:	$515,000
Estimated Implementation Time:	6 months

* The figure is only an estimate: the actual cost will depend on the number of drums encountered.

The excavation and removal of all known and suspected buried drums and associated contaminated soils prior to capping is an additional, separate option that could be used in conjunction with any or all of the containment Alternatives LF-3 through LF-7. Under this option, excavation would be initiated at test pit (TP) locations TP-6 through TP-17 and TP-19 until ground water is encountered, the fill area depth limit is reached, or until no more drums are found. All excavated drums and visually contaminated soils would be sampled and tested. Contaminated materials would be shipped off-site for disposal, possibly by incineration. The Site would be graded prior to installation of the selected cap.

XI. CRITERIA FOR EVALUATION

During the detailed evaluation of alternatives, each alternative is assessed against nine evaluation criteria. The nine criteria are described below:

Overall Protection of Human Health and the Environment addresses whether or not a remedy provides adequate protection and describes how risks are eliminated, reduced or controlled through treatment, engineering controls or institutional controls.

Compliance with Applicable or Relevant and Appropriate Requirements of Federal or State of New Jersey Regulations addresses whether or not a remedy will meet all of the applicable or relevant and appropriate requirements of other environmental statutes and/or provide grounds for invoking a waiver.

Long-Term Effectiveness and Permanence refers to the ability of the remedy to maintain reliable protection of human health and the environment over time once cleanup goals have been met.

Reduction of Toxicity, Mobility or Volume addresses the anticipated performance of the treatment technologies that a remedy may employ.

Short-Term Effectiveness involves the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period until cleanup goals are achieved.

Implementability examines the technical and administrative feasibility of a remedy, including availability of materials and services needed to implement a particular option.

Cost includes capital, operation and maintenance costs, and net present worth.

State Acceptance indicates whether, based on its review of the RI/FS Reports and the Proposed Plan, the State concurs with, opposes, or has no comment on the preferred alternative at the present time.

Community Acceptance will be assessed in the Record of Decision following a review of the public comments received on the RI/FS Reports and the Proposed Plan.

The following is a comparative analysis of the alternatives based upon the evaluation criteria noted above.

XII. ANALYSIS OF CRITERIA

The NJDEP and the EPA are required to select the remedial alternative which offers the best balance among the nine criteria above. The selected remedy must meet the first two criteria, protection of human health and the environment, and compliance with ARARs, unless a waiver for ARARs is granted. The manner in which the preferred alternative meets the nine criteria is briefly discussed below.

Overall Protection of Human Health and the Environment

Except for the No Action and Minimal Action alternatives, all of the containment alternatives, LF-3 through LF-7, would minimize the potential human and ecological risk associated with surface soil, sediment and air pathway exposure to an acceptable level. These alternatives would also minimize precipitation infiltration to the waste, thereby reducing the potential for contamination migration. The Sip Avenue ditch sediments would be isolated from future exposure potential.

However, capping would result in the loss or alteration of terrestrial and aquatic wildlife habitats in the PJP Landfill area. Some estuarine emergent wetlands would be capped as part of the proposed actions. Shallow water aquatic habitat in the Sip Avenue ditch would be lost as a result of the proposed filling. These actions generally would result in a loss of some wetland-associated species from the immediate Site area and in the loss of aquatic life from the ditch area. Terrestrial species adapted to grass/field environments are likely to inhabit the area once vegetation has been established on the cap. In order for the capping alternatives LF-3 through LF-7 to meet this criterion, wetlands mitigation activities (i.e. restoration, land banking) would have to be implemented at the Site.

Option 2, the excavation and removal of all known and suspected buried drums and associated contaminated soils option, in conjunction with any of the capping alternatives, would provide protection of human health and the environment by reducing on-site contaminant concentrations.

Compliance with ARARs

Actions taken at any Superfund site must achieve ARARs of federal and state laws or provide grounds for waiving these requirements. The No Action, Minimal Action, and LF-3: Soil Cover Alternatives do not comply with federal and state ARARs which regulate the closure and capping of either solid waste or hazardous waste landfills.

The No Action, Minimal Action, and other capping alternatives do not address contamination in Sip Avenue Ditch sediments which are at levels in exceedance of the criteria set forth in the NOAA sediment screening criteria. However, the capping alternatives all provide for replacement of the Sip Ave ditch with an alternative form of drainage, and would also provide protection from rainwater infiltration, thus reducing potential migration of subsurface contaminants into the groundwater. An additional benefit is that, once capped, the contaminants would present no direct contact hazard.

As part of the IRM in 1986, an estimated 10,000 drums were disposed off-site. ARAR compliance would be aided by Option 2 (excavation and removal of the other buried drums and surrounding contaminated soil) in conjunction with any of the capping alternatives.

Because No Action and Minimal Action alternatives do not meet both threshold requirements of overall protection of human health and the environment or compliance with ARARs, they will not be considered further in the evaluation of alternatives.

Long-Term Effectiveness and Permanence

The capping alternatives would promote surface water run-off; cap implementability may offset the need for ground water collection and treatment. RI data has shown a significant reduction in contaminant concentration in the ground water on the previously capped portion of the landfill. This would suggest that each capping alternative would aid ground water in the process of natural attenuation, while at the same time isolating the Sip Avenue Ditch sediments from future exposure potential. However, the capping alternatives do vary in permeability. The least permeable cap will provide the least migration of landfill contaminants off-

site. Alternative LF-7, New RCRA Hazardous Waste Cap, has the least permeability while LF-3, Soil Cover, has the greatest.

Option 2 : Drum Removal (Known and Suspected Buried Drum Areas and Associated Contaminated Soils) in conjunction with a capping selection is the most effective in the long-term and the most permanent because the most concentrated areas of contamination would be permanently removed (in addition to the estimated 10,000 drums that were previously removed) from the Site and contaminated materials would then be shipped off-site for disposal, possibly incineration.

Short-Term Effectiveness

In general, effective alternatives which can be implemented quickly with little risk to human health and the environment are favored under this criterion. The containment alternatives without the excavation option have high short-term effectiveness because they could be implemented relatively quickly (within three years) and would have relatively minor short-term risks to nearby workers, residents and commuters.

Construction of any of the containment alternatives would involve some excavation and handling of contaminated soils during the initial Site regrading, but exposure could be reduced through the use of suitable protective clothing and equipment. Exposure of the surrounding community through fugitive dust emissions could be easily controlled using standard construction practices and air monitoring. Short-term risks to the community, workers, or the environment are expected to be minor. Reduction in exposure risk is achieved in the short-term.

However, the excavation, removal and off-site disposal of buried drums and associated contaminated soils option (Option 2) provides potentially hazardous conditions for the workers, community, commuters on the Pulaski Skyway, and the environment. The potential explosive nature of the test pit drums and the relatively close proximity to workers, residents and commuters increases the risks associated with this option.

Reduction of Toxicity, Mobility or Volume

The containment alternatives without the excavation option would prevent direct contact with the contaminated Sip Ave Ditch sediments and reduce mobility by preventing the migration of contaminants by air and erosion. The cap would also reduce leaching of contaminants into ground water. However, these alternatives alone would not reduce toxicity or volume of the contaminants.

Option 2, the excavation and removal of all known and suspected buried drums and associated contaminated soils and off-site treatment, reduces the toxicity, mobility and volume of the contaminated material. In addition, the capping alternative would further reduce the mobility of any contaminants remaining on Site after excavation.

Implementation

All of the alternatives are implementable from an engineering standpoint. The capping alternatives without the excavation option are easy to implement with the technology, equipment and resources being established and readily available. The RCRA Hazardous Waste Cap alternatives, LF-6 and LF-7, would take longer than the Solid Waste Cap alternative due to the multiple layer construction.

The excavation and removal of all known and suspected buried drums and associated soils option is feasible, however, the implementation would present some difficulty due to the potential health and safety hazards. This option would also add to the length of time required to implement the remedy.

Cost

The costs of the capping alternatives are all the same order of magnitude, with the least expensive being the Solid Waste Cap $22,022,000 and the most expensive being the NJDEP Hazardous Waste Cap $35,029,000 and the New RCRA Hazardous Waste Cap $47,879,000.

The excavation and removal option, Option 2, increases the cost of each of the capping alternatives. Although subsurface contamination is not a current risk pathway, the excavation and removal option affords a degree of long-term effectiveness and permanence by excavation, removal and off-site treatment of all known and suspected buried drums and associated highly contaminated visually stained soil. In addition, this option would minimize any future ground water contamination which may occur as the result of wastes contained in these known and suspected buried drum areas. Therefore, the cost of the value added from the reduction of subsurface contaminants may be warranted by reduc-

ing and possibly eliminating, the need for long-term, ground-water pump and treat.

XIII. SUMMARY OF THE PREFERRED ALTERNATIVE

After evaluating the various alternatives, NJDEP and EPA recommend the combination of Alternative LF-4: NJDEP Solid Waste Cap (extending existing cap), replacement of the Sip Ave ditch with an alternate form of drainage, and Option 2: Excavation, Removal and Off-Site Disposal of All Known and Suspected Buried Drums and Associated Contaminated Soils Prior to Capping, as the preferred alternative for addressing the remedial objectives at the Site.

This alternative involves:

- Removal of all known and suspected buried drum materials and associated visibly contaminated soils;
- Capping the remaining landfill area of the Site with a multi-layer, solid waste cap in accordance with NJDEP Bureau of Landfill Engineering Guidance with gas venting;
- Extending the existing gravel lined ditch around the perimeter of the Site to collect the surface water runoff;
- A passive gas or active venting system installed in the new portion of the cap. However, if an active system is deemed necessary, both areas will be included;
- Site fencing and institutional controls (e.g., deed restrictions and public information program);
- Quarterly inspections and maintenance, and a re-evaluation of the previously capped area, after five years;
- Replacing the Sip Ave ditch with an alternate form of drainage;
- Quarterly ground water monitoring to evaluate the reduction of contaminant concentrations over time;
- Modeling to demonstrate the effectiveness of the cap by predicting the impact of ground water leachate migrating to the Hackensack River from the landfill under the conditions at the end of the 5 year period; and
- Implementation of a wetlands assessment and restoration plan.

The multi-layer cap would comply with NJDEP sanitary landfill closure requirements. Since removal of all known and suspected drums and associated contaminated soils would remove the significant hazardous waste deposited in the landfill, closure utilizing a RCRA hazardous waste cap is not necessary. The use of a passive or active gas venting system would be determined during the remedial design phase of the project.

In order to provide for adequate protection against water infiltration at the site, periodic inspections of the cover installed during the IRM will be performed. If the cap is found to be damaged or degraded, then at least one additional foot of topsoil will be added to the cover. Ground water and surface water monitoring will be performed quarterly, initially, to evaluate the reduction of contaminant concentrations and to determine if natural attenuation is occurring at the site. The Site would be reviewed at the end of five years in order to reevaluate Site conditions. The review would include an analysis of the monitoring data, which would be used in a ground water model aimed at determining the need for further action. The review will also include an assessment of current residual health risks, an evaluation of the effectiveness of the Site fencing to control access, and an evaluation of what additional remedial measures, if any, should be implemented based on the reviewed Site conditions.

The preferred alternative provides the best balance among alternatives with respect to the evaluation criteria. NJDEP and EPA believe that the preferred alternative would be protective of human health and the environment, would comply with ARARS, would comply with the Remedial Action Objectives, would be cost-effective, and would utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable.

The excavation and removal of all known and suspected buried drums and associated highly contaminated soils is protective of human health and the environment. The preferred alternative provides for long-term effectiveness and permanence by removing and treating the highly contaminated materials from the Site. The long-term effectiveness and permanence of the alternative outweigh short-term risks associated with excavation.

Remedial Investigation and subsequent sampling results indicate that contaminants' concentrations in the shallow aquifer are reducing over time. Ground water contamination in the deep aquifer is at concentrations below any

level of concern at the present time.

Implementation of the preferred alternative (i.e., capping and removing drums) will reduce the leaching of contaminants into ground water. The five year ground water and surface water monitoring and modeling program will enable NJDEP to evaluate what, if any, impact ground water or leachate is having on the Hackensack River. If a significant adverse impact is found, NJDEP will evaluate the need for hydraulic controls to mitigate this impact.

The preferred alternative provides protection to human health by preventing direct contact with the contaminated material, and by preventing the migration of contaminants by reducing infiltration and erosion. Moreover, the combination of this alternative and the excavation and removal of all known and suspected buried drums and associated contaminated soils option, would satisfy the statutory preference for remedies which utilize treatment as a principal element.

The implementation of a qualitative assessment of the habitat value, acreage, tidal influences and other defining factors will characterize the wetlands and better provide requirements for the restoration of any wetlands found to be impacted.

NJDEP realizes the inherent short-term risks associated with excavation and removal of buried drums and associated contaminated soils. For this reason, NJDEP would implement a comprehensive Site Health and Safety Plan to mitigate the short-term risks to nearby workers, residents, and commuters.

Maintaining the level of risk reduction afforded by the proposed remedy depends on preserving the long-term integrity of the cap and enforcement of institutional controls. Institutional controls would include use restrictions to restrict future use of the Site and public information programs to increase the public awareness of potential problems associated with the Site. The NJDEP Solid Waste Cap has proven to be a very effective and reliable remedial technology. Implementing the NJDEP Solid Waste Cap also presents few short-term risks. In addition, the NJDEP Solid Waste Cap with the incorporation of the existing cap provides the maximum protection to human health and the environment at a reasonable cost.

GLOSSARY

This glossary defines the technical terms used in this Proposed Plan. The terms and abbreviations contained in this glossary are often defined in the context of hazardous waste management, and apply specifically to work performed under the Superfund program. Therefore, these terms may have other meanings when used in a different context.

Bis(2-ethylhexyl)phthalate
Bis(2-ethylhexyl)phthalate is a type of phthalate ester, an organic compound widely used as a plasticizer in the construction and automobile industries, and in the production of household products, toys, clothing and medical products. Plasticizers are added to plastics or other materials to keep them soft or pliable. Phthalate esters are suspected carcinogens and are currently being studied to better understand their effects on human health and the environment.

Cap
A layer of material, such as clay or a synthetic material, used to prevent rainwater from penetrating and spreading contaminated materials. The surface of the cap is generally mounded or sloped so water will drain off.

Carcinogen
A substance that causes cancer.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)
A Federal law passed in 1980 and modified in 1986 by the Superfund Amendments and Reauthorization Act. The Acts created a special tax that goes into a Trust Fund, commonly known as Superfund, to investigate and clean up abandoned or uncontrolled hazardous waste sites. Under the program EPA can either: pay for site cleanup when parties responsible for the contamination cannot be located or are unwilling or unable to perform the work; or, take legal action to force parties responsible for site contamination to clean up the site or pay back the Federal government for the cost of the cleanup.

Closure
The process by which a landfill stops accepting wastes and is shut down under federal or state guidelines that ensure the public and the environment are protected.

Exposure Pathways
The route through which an individual can come into contact with a contaminant. Inhalation of contaminated air and ingestion of contaminated water are examples of two exposure pathways.

Ground water
Water found beneath the earth's surface that fills pores between materials such as sand, soil or gravel. In aquifers, ground water occurs in sufficient quantities that it can be used for drinking water, irrigation and other purposes.

Hot Spot
An area or vicinity of a site containing exceptionally high levels of contamination.

Inorganic Chemical
A class of chemical compounds not containing carbon and composed of minerals, including salts and metals such as lead, zinc and iron.

Interim Remedial Measure (IRM)
An action that can be taken quickly to limit exposure or threat of exposure to a significant health or environmental hazard at sites where planning for remedial actions is underway.

Landfill
A disposal facility where waste is placed in or on land.

Leaching
The process by which soluble chemical components are dissolved and carried through soil by water or some other percolating liquid.

Migration
The movement of contaminants, water, or other liquids through porous and permeable rock.

National Oil and Hazardous Substances Contingency Plan (NCP)
The Federal regulation that guides the Superfund program.

National Priorities List (NPL)
EPA's list of the most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term remedial response using money from Superfund. The list is based primarily on the score a site receives utilizing the Hazard Ranking System. The NPL is updated at least once a year.

Operable Unit
An action taken as one part of an overall site cleanup. For example, a carbon adsorption system could be installed to halt rapidly spreading ground water contaminants while a more comprehensive and long-term remedial investigation and feasibility study is underway. A number of operable units can be used in the course of a site cleanup.

Organic Chemical
A class of carbon containing compounds derived from living organisms.

Parts Per Million (ppm)
Units commonly used to express low concentrations of contaminants. For example, one drop of benzene in one million drops of water means that the water contains 1ppm benzene.

Petroleum Hydrocarbons
Petroleum hydrocarbons are a complex mixture of chemicals derived from crude oil. Petroleum hydrocarbons include natural gas, mineral oil, gasoline and asphalt.

Polycyclic Aromatic Hydrocarbon (PAH)
PAHs, such as pyrene, are a group of highly reactive organic compounds found in motor oil. They are a common component of creosotes and can cause cancer.

Present Worth Cost
The sum of money invested at a given rate of compound interest that will accumulate to pay for the implemented remedial action at a future date.

Record of Decision (ROD)
A public document that explains which cleanup alternatives will be used at National Priorities List sites where the Superfund program pays for the cleanup. The Record of Decision is based on information and technical analysis generated during the remedial investigation/feasibility study and consideration of public comments and community concerns.

Remedial Investigation/Feasibility Study (RI/FS)
A two part study which must be completed before Superfund cleanup can begin. The first portion, the RI, examines the nature and extent of contamination at the site. The second part, the FS, evaluates several possible alternatives for addressing contamination problems.

Resource Conservation and Recovery Act (RCRA)
A Federal law that established a regulatory system to track hazardous substances from the time of generation to disposal. The law requires safe and secure procedures to be used in treating, transporting, storing and disposing of hazardous substances. RCRA is designed to prevent new, uncontrolled hazardous waste sites.

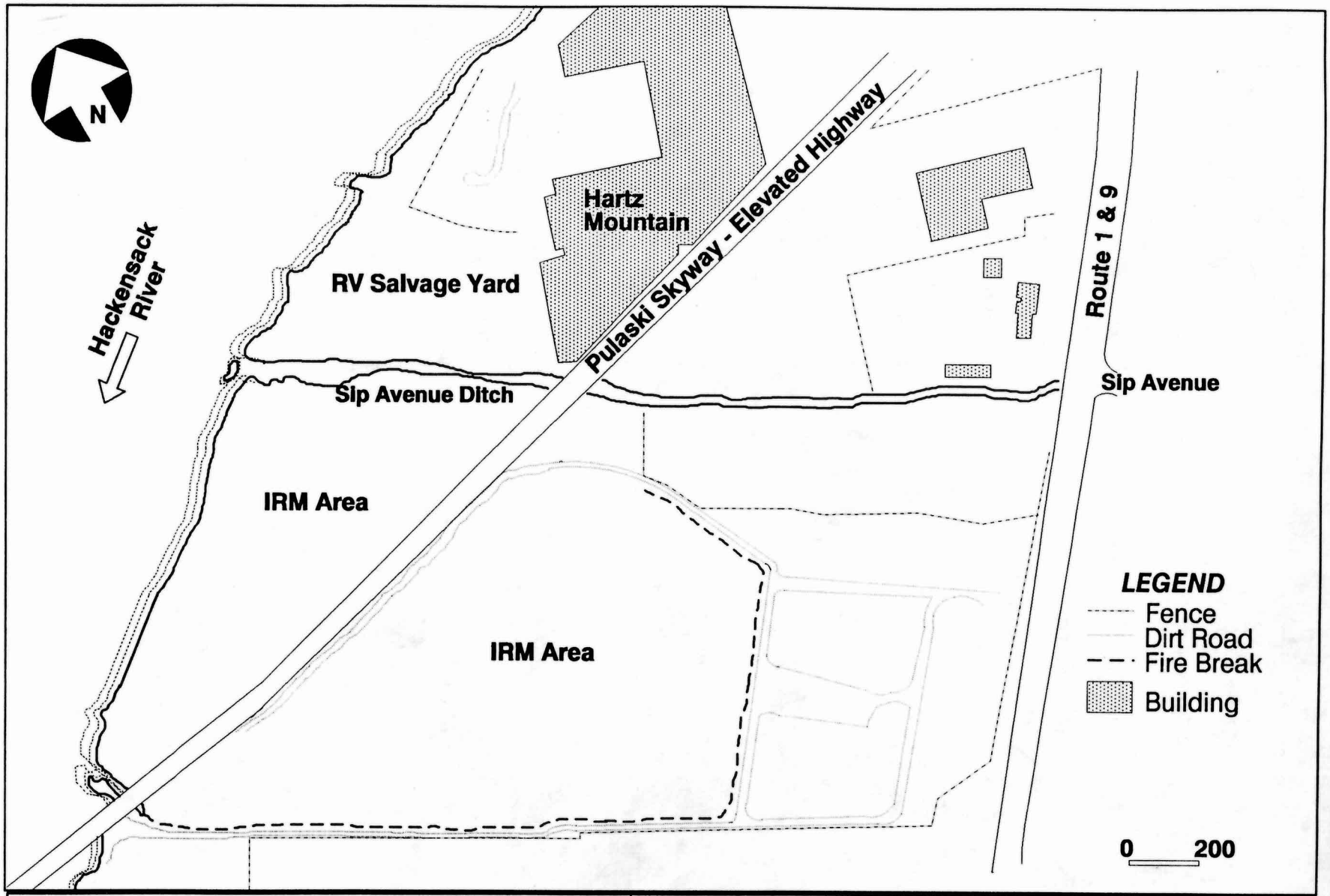
Responsiveness Summary
A summary of oral and/or written public comments received by EPA during a public comment period on key EPA documents, and EPA's responses to those comments.

Runoff
The discharge of water over land into surface water. It can carry pollutants from the air and land into receiving waters.

Sediment
The layer of soil and minerals at the bottom of surface waters, such as streams, lakes, and rivers, that absorb contaminants.

Surface Water
Bodies of water that are above ground, such as rivers, lakes, and streams.

Wetlands
An area that is regularly saturated by surface water or groundwater and, under normal circumstances, capable of supporting vegetation typically adapted for life in saturated soil conditions. Wetlands are critical to sustaining many species of fish and wildlife. Wetlands generally include swamps, marshes, and bogs. Wetlands may be either coastal or inland. Coastal wetlands have salt or brackish (a mixture of salt and fresh) water, and most have tides, while inland wetlands are non-tidal and freshwater. Coastal wetlands are an integral component of estuaries.



Site Map

PJP LANDFILL, JERSEY CITY, NEW JERSEY